OPERATING INSTRUCTIONS

Montrac
Positioning Unit
PV-2/3

508496

ENGLISH

Edition: 03/2005

Change index

Editions issued so far:

Edition	Comments	Order number
06/2004	Initial edition	508496

Table of Contents

1 Positioning unit

1.1 Directives of the positioning unit which have been fulfilled

The directives fulfilled relate to all operating states which may arise in a Montrac transport system and to all functions which the positioning unit has to perform according to the description.

1.2 EU conformance (to EC Directive on Machines, Appendix II A)

Regulations and standards taken into account:

EC Directive on Machines 98/37/EC

Manufacturer:

SCHMID Group | montratec AG
Zielmattenring 6
4563 Gerlafingen
Tel. +41 32 55 88 700
Fax. +41 32 55 88 799

1.3 Description of function

In the positioning unit, the platforms transported by the shuttles are positioned and held with an accuracy of ±0.02 mm in the horizontal plane (x and y direction) and ±0.2 mm in the vertical direction (z direction). At the same time, the platform is supported from below.
When the shuttles are moved into the positioning unit, the platform is slighlty raised by ball bearings, with the result that it is positioned in the vertical direction.
Positioning in the horizontal plane (x and y direction) is performed by moving a wedge-shaped Pusher driven by a double-action pneumatic cylinder into the V-shaped opening which is arranged on the longitudinal side of the shuttle platform.
The presence and the mechanical locking of the platform are polled by means of inductive proximity switches.
A dovetail permits fixing to Quick-Set® elements.
A special version of the positioning unit is the MPV. The accuracy of the MPV is ±0.03 mm in the horizontal plane and ±0.2 mm in the vertical plane.
In the multiple positioning unit, an appropriately equipped platform (several V-shaped openings on the longitudinal side) can be held and positioned several times in succession depending on the chosen spacing.
Consequently, it is possible to save one axis in the horizontal plane (in the direction of travel), i.e. a portal axis can be used instead of an XY portal unit or a robot.
It is also possible, with an appropriately equipped platform, to perform single positioning in one station of the system and multiple positioning in another station of the system.

Versions	Platform dimensions	Art. No.
Single positioning unit	200 x 300 mm	55290
	300 x 400 mm	55292
	200 x 550 mm	55294
Multiple positioning unit	200 x 300 mm	55291 [1)]
	300 x 400 mm	55293 [2)]
	200 x 550 mm	55295 [3)]
Other sizes	Max. 400x700	Exo

[1)] max. 6 positions possible
[2)] max. 8 positions possible
[3)] max. 12 positions possible

1.4 Dangers

Danger of crushing in manual workstations with positioning unit, see section on shuttle

On moving the shuttle into positioning units which, because of the necessary accessibility (e.g. manual workstation), cannot be made secure by separating, fixed protective devices with locking according to EN 292-2 Section 4.2.2.2 or with locked, separating protective devices with locking according to EN 292-2 Section 4.2.2.3. a), it is essential to reduce the shuttle speed.
In order to achieve this, the AB cam is positioned 150 mm before the inlet edge of the beam (before the buffer) of the positioning unit (see section on shuttle).

1.5 Additional information

This User Manual is intended to ensure that the positioning unit is used properly and safely. If information is lacking for your application, please contact the manufacturer.

1.6 Validity of the User Manual

Our products are continually updated to reflect the latest state of the art and practical experience.
In line with product developments, the User Manuals are continually updated.
To avoid confusion, please check whether the present User Manual is valid for the positioning unit to be commissioned.

2 Technical data

Art. No.		**55290**	**55291**	**55292**	**55293**	**55294**	**55295**
Weight *	(kg)	11.6	12.6	12.8	14.7	14.6	16.8
Drive medium		Oiled or unoiled air filtered to 5 µm					
Operating pressure	(bar)	3–6					
Nominal pressure	(bar)	5					

Ambient conditions	Permissible temperature range	10–40 °C
	Air Purity	Atmosphere for assembly of precision engineering products
	Relative humidity	≤90% non-condensing

Air consumption PV 22 cm^3/double stroke (at 5 bar)

Air consumption start element (pneumatic) 2.1 cm^3/double stroke (at 5 bar)

Pneumatic connection for hose ø2.7/ø4 mm

* Including fixing set and cross-struts

2.1 Load limits

See Section 2.1.04

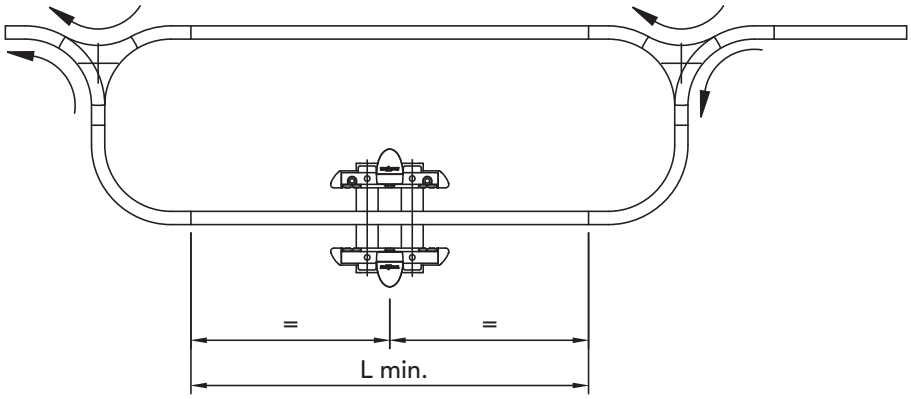
The loads which are permitted to act on a platform present in the positioning unit are shown in the section on the shuttle. In the case of higher load values, it is necessary to contact SCHMID.

2.2 Installation

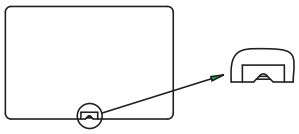
The minimum Trac length L_{min} (Fig. 2.1) must be complied with when installing the positioning unit.

2.2.1 Minimum Trac length

Fig. 2.2-1: Minimum Trac length

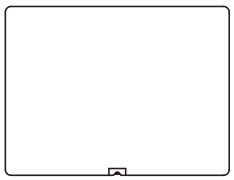


Art. No. Positioning unit = 55290
Platform 200x300 mm, single
L_{min} = 650 mm



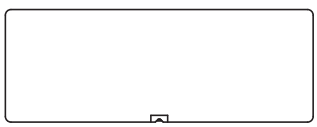
Art. No. Positioning unit = 55291
Platform 200x300 mm, multiple
L_{min} = 720 mm

Art. No. Positioning unit = 55292
Platform 300x400 mm, single
L_{min} = 950 mm



Art. No. Positioning unit = 55293
Platform 300x400 mm, multiple
L_{min} = 1100 mm

Art. No. Positioning unit = 55294
Platform 200x550 mm, single



L_{min} = 1400 mm

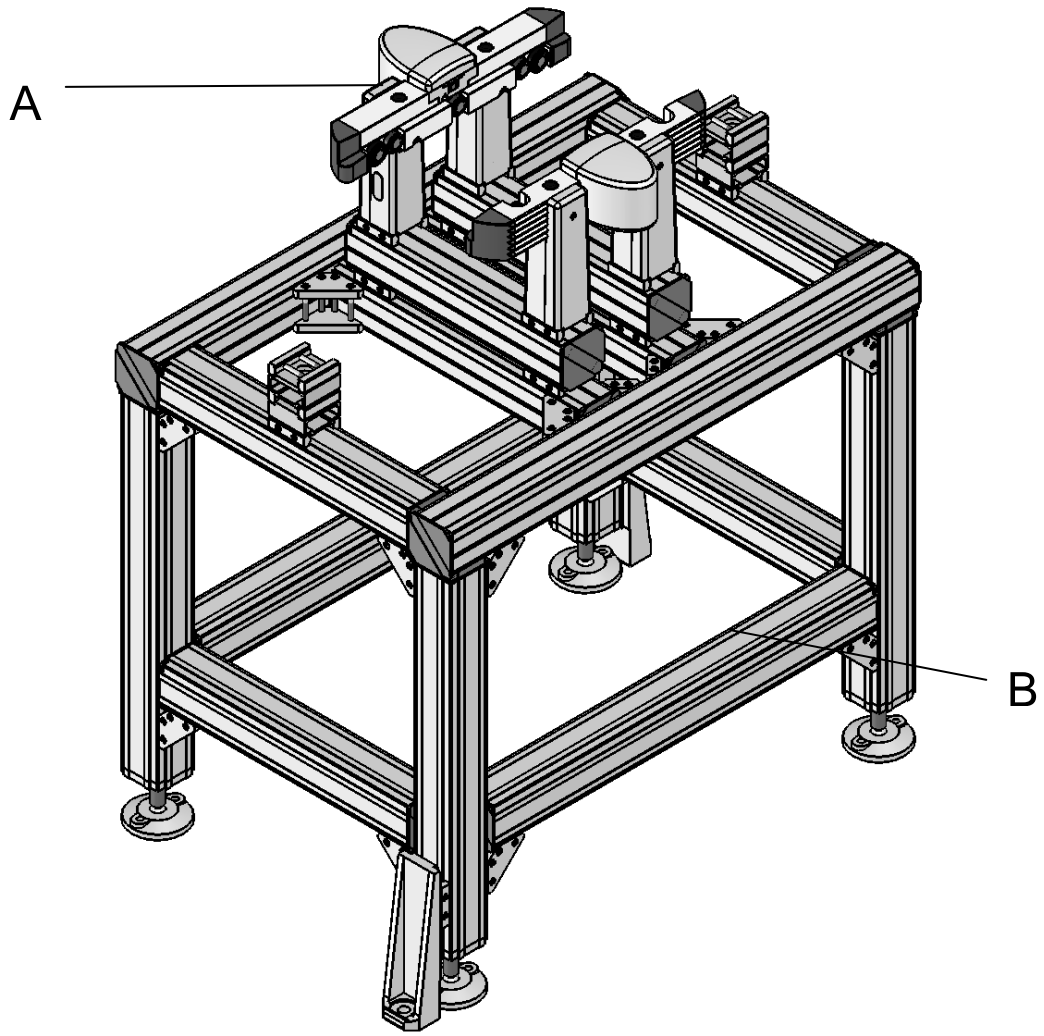
Art. No. Positioning unit = 55295

Platform 200x550 mm, multiple

L_{min} = 1600 mm

2.3 Support on a substructure of Quick-Set® profiles

Fig. 2.3-1: Support on a substructure of Quick-Set® profiles

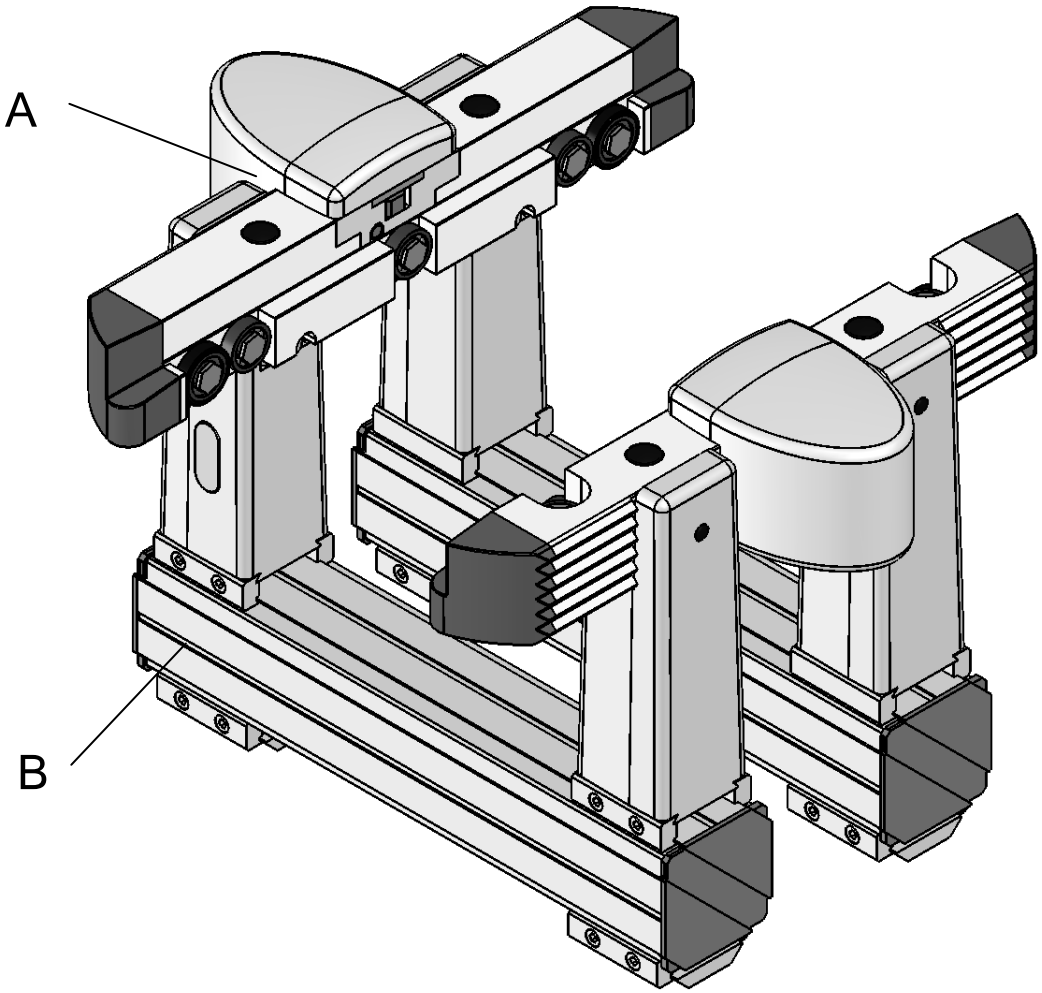


A: Postioning device including locking cylinder with exhaust air throttles but without proximity switches and signal generators.

B: Quick-Set® substructure

2.4 Support on a flat table top

Fig. 2.4-1: Support on a flat table top



A: Positioning unit including locking cylinder with exhaust air throttles but without proximity switches and signal generators.

B: Fixing set

3 Commissioning

3.1 Adjusting the positioning unit

Adjusting with the aid of the

setting gage for width 200 (Art. No. 55386)
setting gage for width 300 (Art. No. 55387)

Precision spirit level for width 200 (Art. No. 506339)
Precision spirit level for width 300 (Art. No. 507305)

3.1.1 Material for adjustment

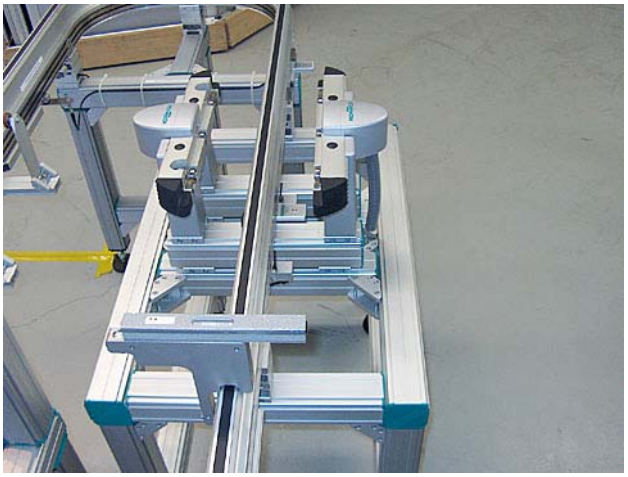
PV / MPV mounted on substructure

e.g. PV 200 x 300

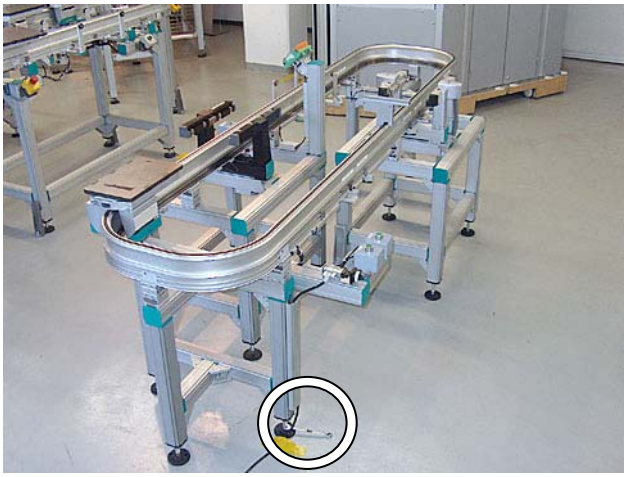
Precision spirit level
L = 200 mm Art. No. 506339
L = 300 mm Art. No. 507305

A setting gage for periodic checking is an essential part of every Montrac system with positioning units.
Setting gage: PV 200 mm wide Art. No. 55386
PV 300 mm wide Art. No. 55387

3.1.2 Checking the horizontal position of the system:

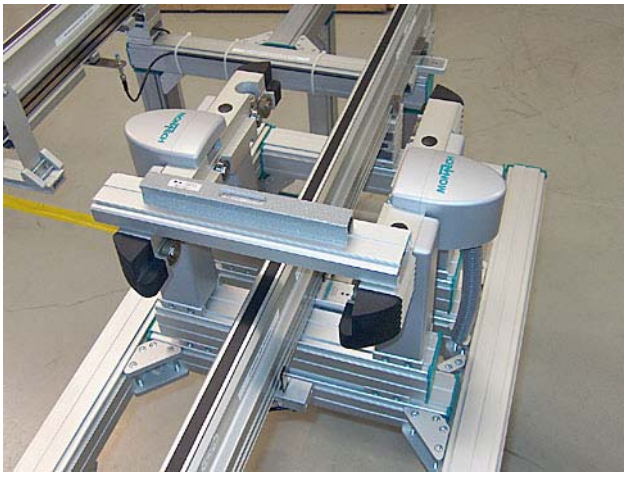


Setting gage before and after positioning of PV. Place precision spirit level on the gage.

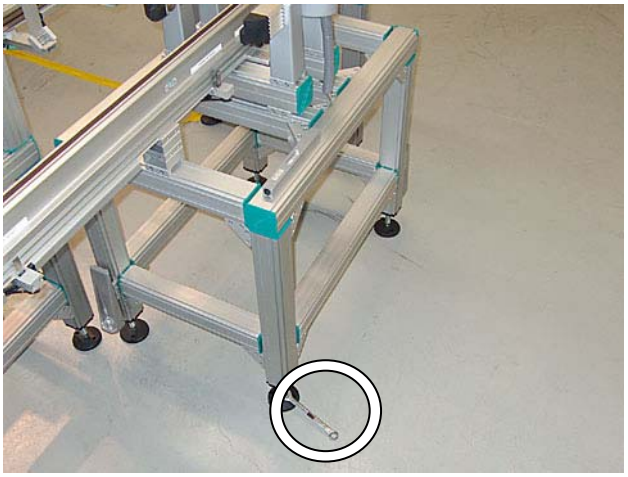


Adjusting the horizontal position of the Trac

On the other side

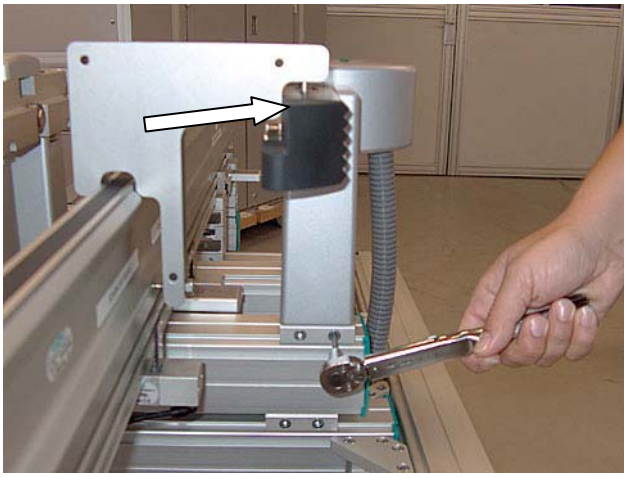


If the horizontal position of the PV is incorrect...

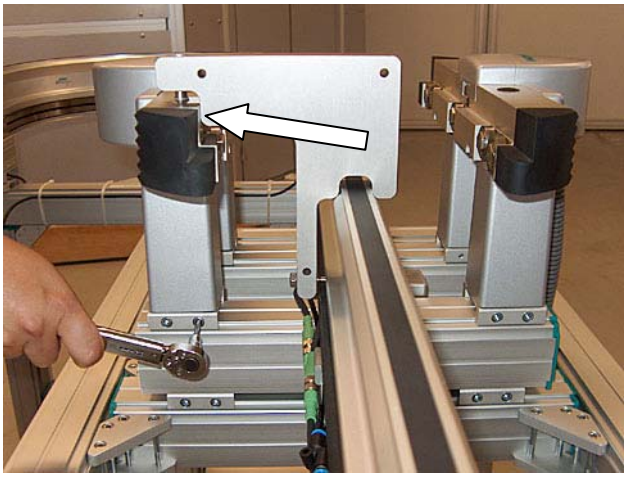


it must be adjusted by means of the feet of the PV substructure using a size 13 fork wrench; not at the Trac end supports.

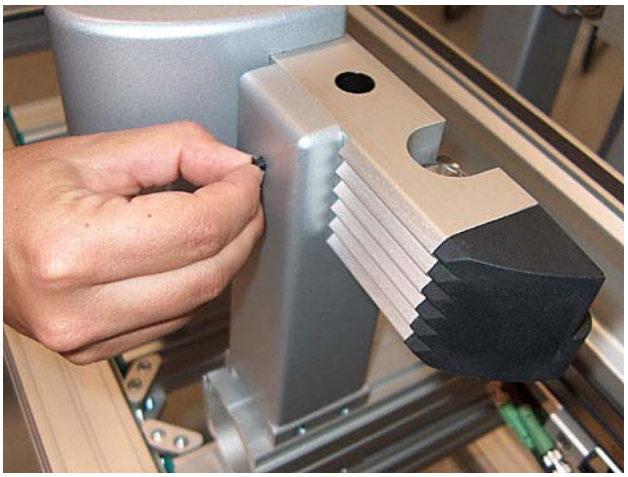
3.1.3 Adjusting the beam



Push the beam up to the stop and tighten screws of clamping element again with 6 Nm.

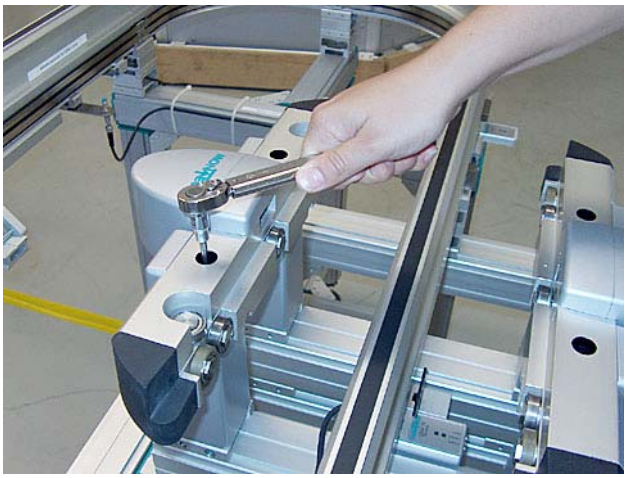


Repeat with all four supports.

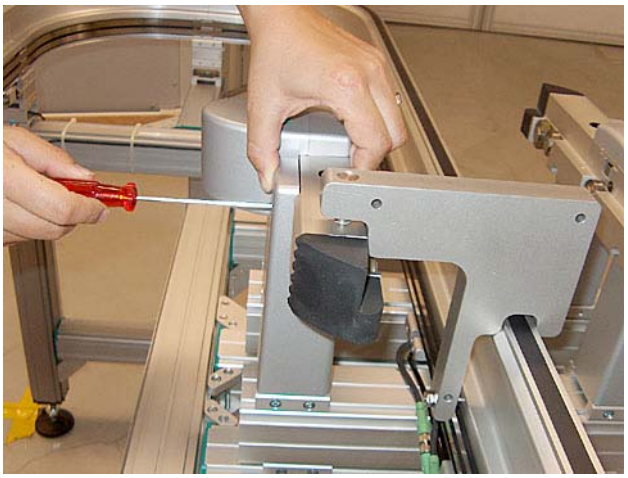


Remove cap

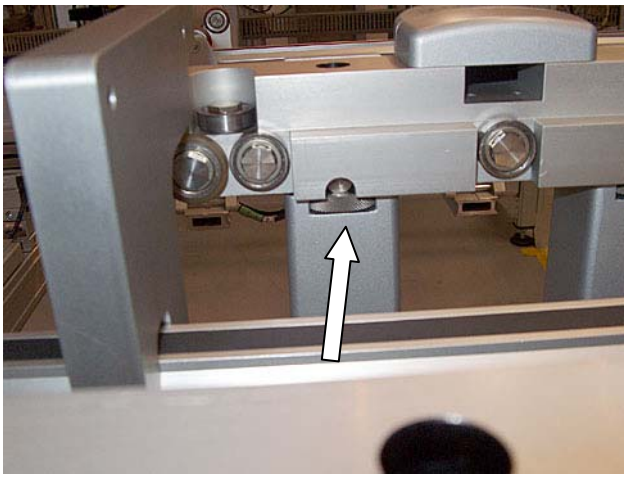
Remove cap



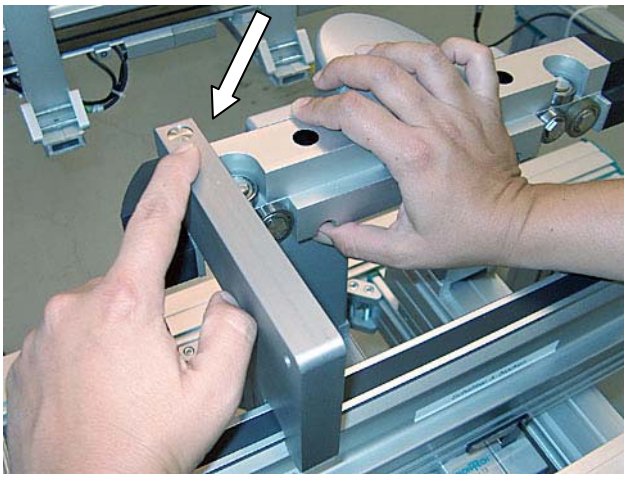
Loosen screw



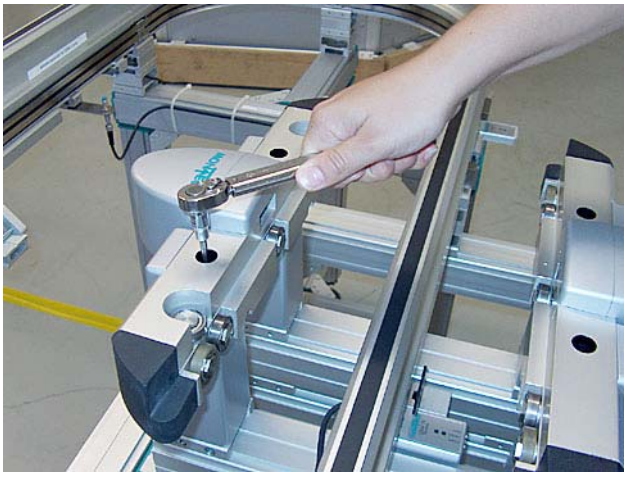
Make a fine adjustment with the grub screw. The setting gage must touch the beam without moving it.



The height is adjusted by means of the knurled screw

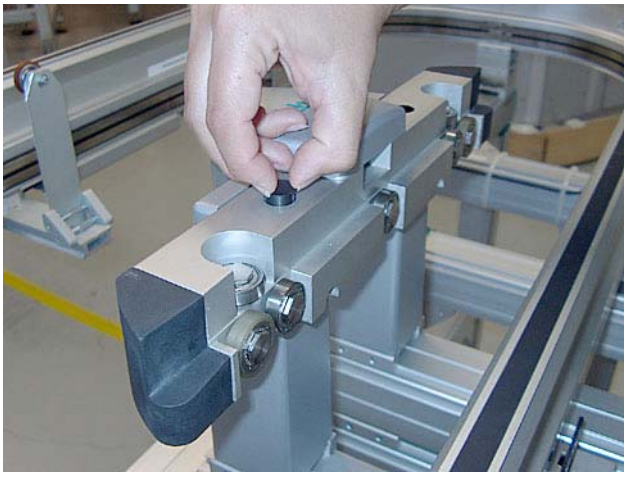


By turning the knurled screw, adjust the bolt until it is flush with the surface of the setting gage.



Tighten screws again

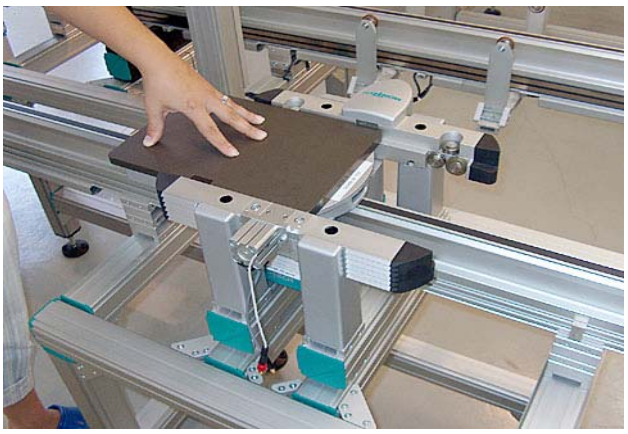
Repeat the procedure with the remaining supports.



Close all holes again

3.1.4 Mechanical check

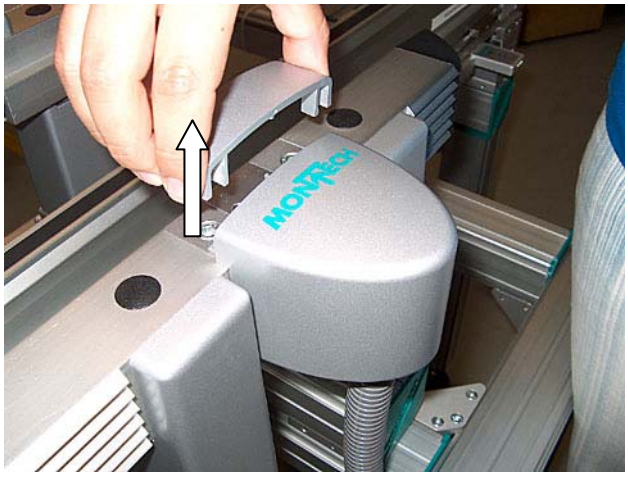
Switch shuttle to "OFF"



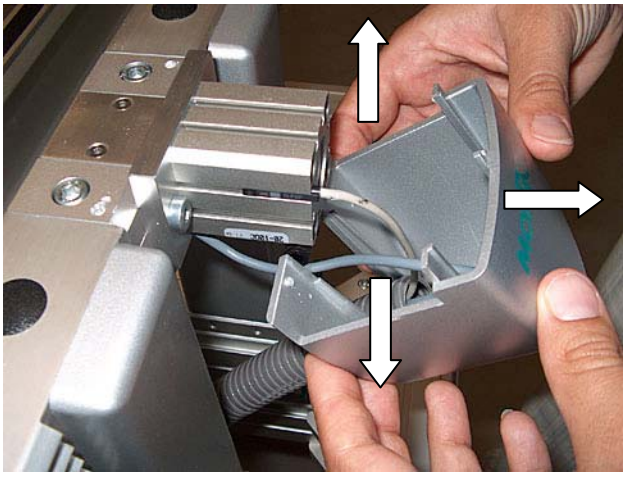
Move the shuttle manually back and forth in the PV and check whether everything is OK.

The platform must be raised about 0.3 mm from the shuttle.

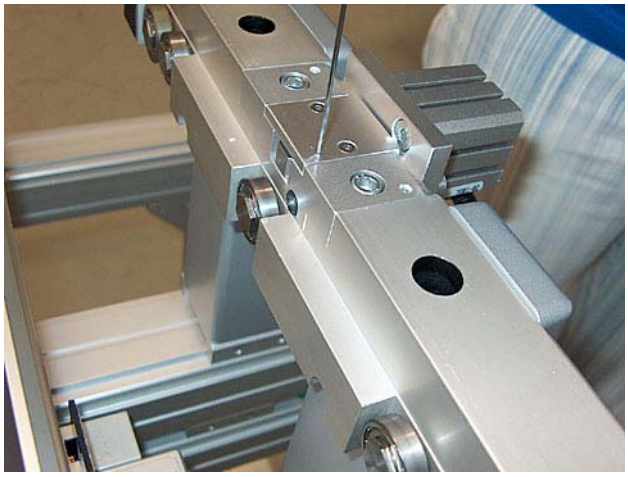
3.1.5 Adjusting the sensors and the air supply



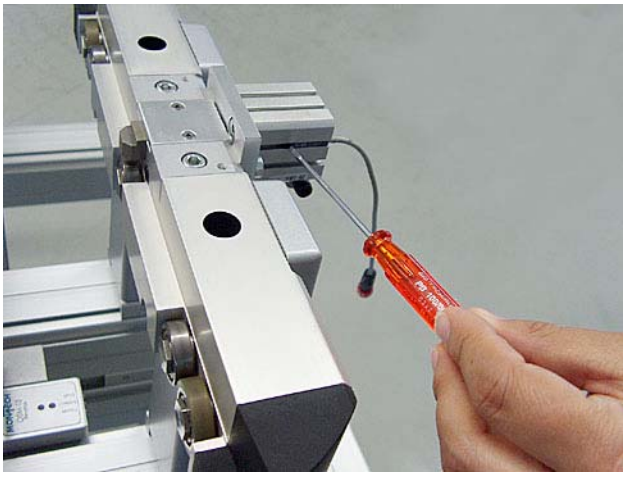
Pull cover 1 upwards to remove it



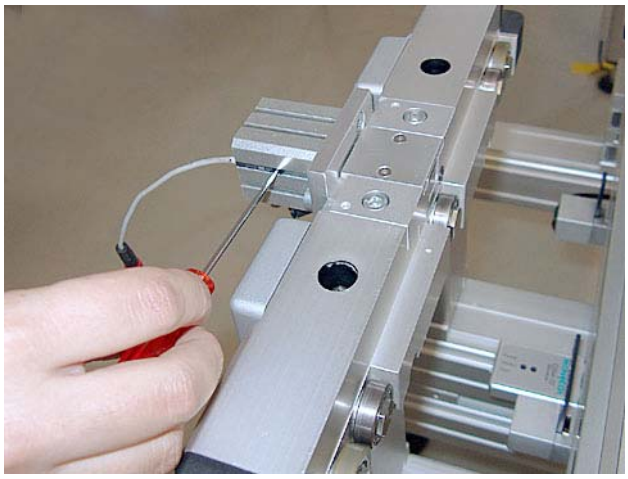
To remove cover 2, Push it alternatively upwards and downwards and at the same time Pull backwards



Undo grub screw and adjust the proximity switch by means of the shuttle platform.



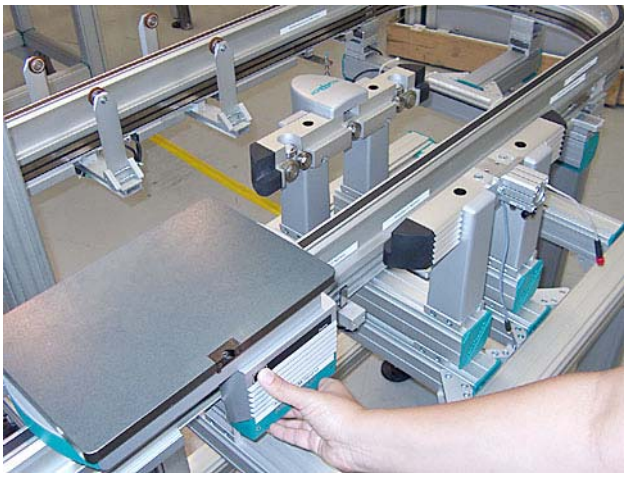
Allow the shuttle to travel until it is locked and then index. Adjust signal generator for the extended Pusher position



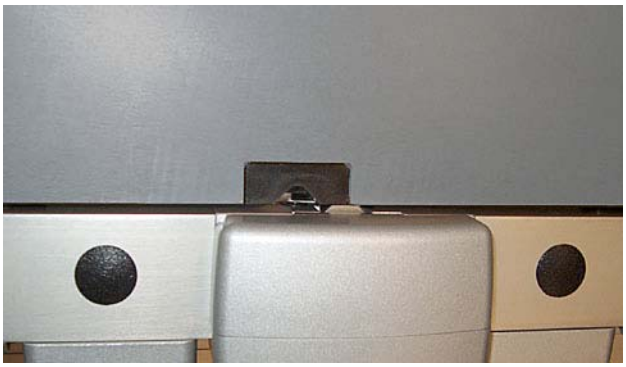
Reset cylinder
Adjust signal generator for the retracted Pusher position

By adjusting the setscrew on the throttle, the extension speed of the Pusher can be adjusted (set to as low a speed as possible).

3.1.6 Setting the stopping position of the shuttle



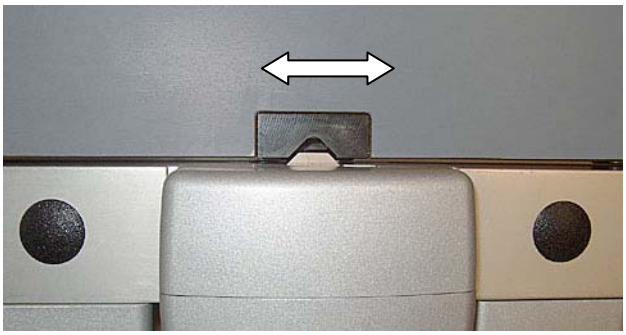
Switch on shuttle



The shuttle stops in the wrong position

In this case, the A cam should be moved

Correct stopping position



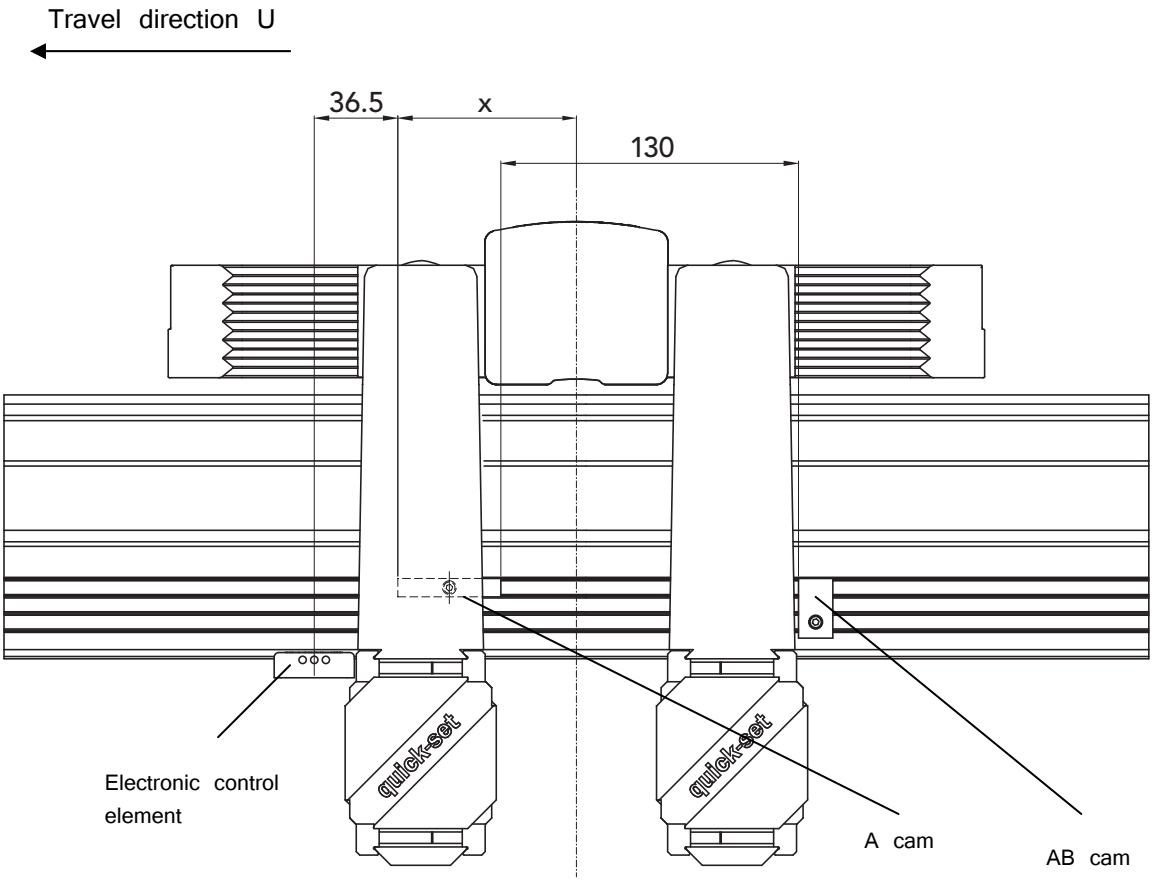
The stopping position of the shuttle is correctly set if the Pusher is extended and the platform remains in position.

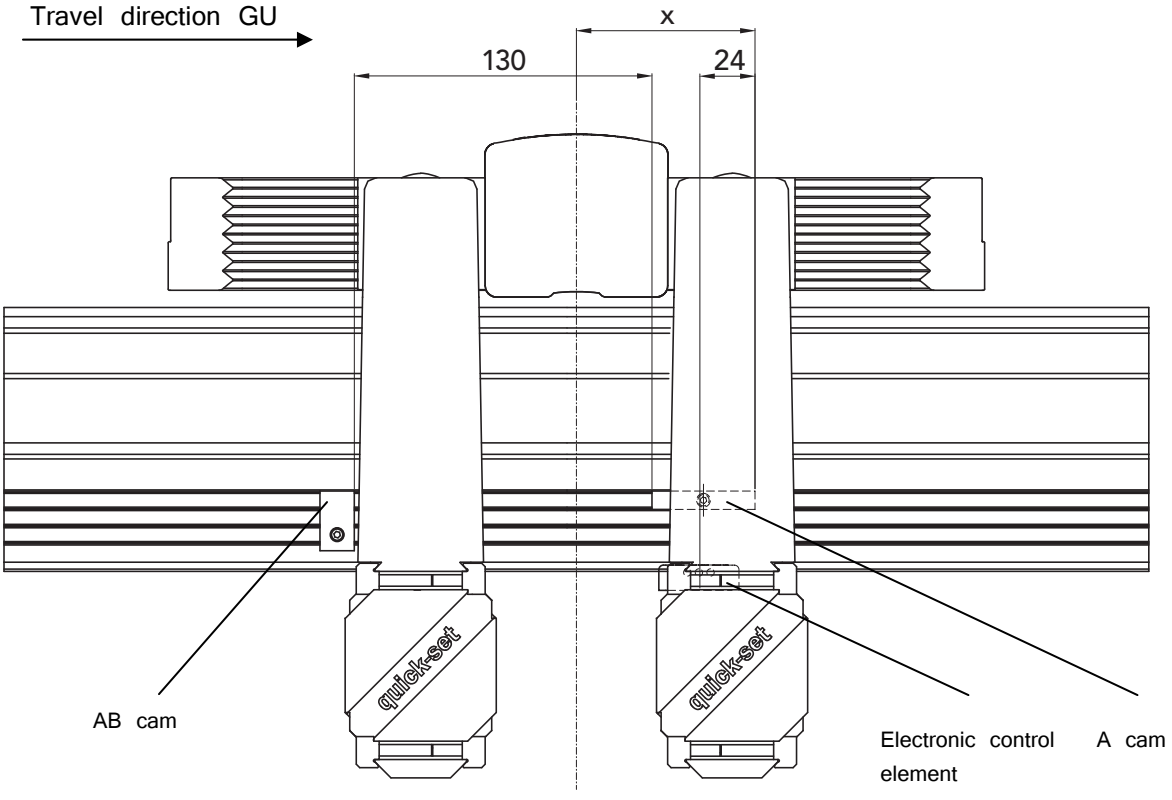
After this adjustment, the AB cam should be repositioned with the standard dimension 130 mm betwen the AB cam and A cam

3.2 Arrangement of the control cams in single positioning unit

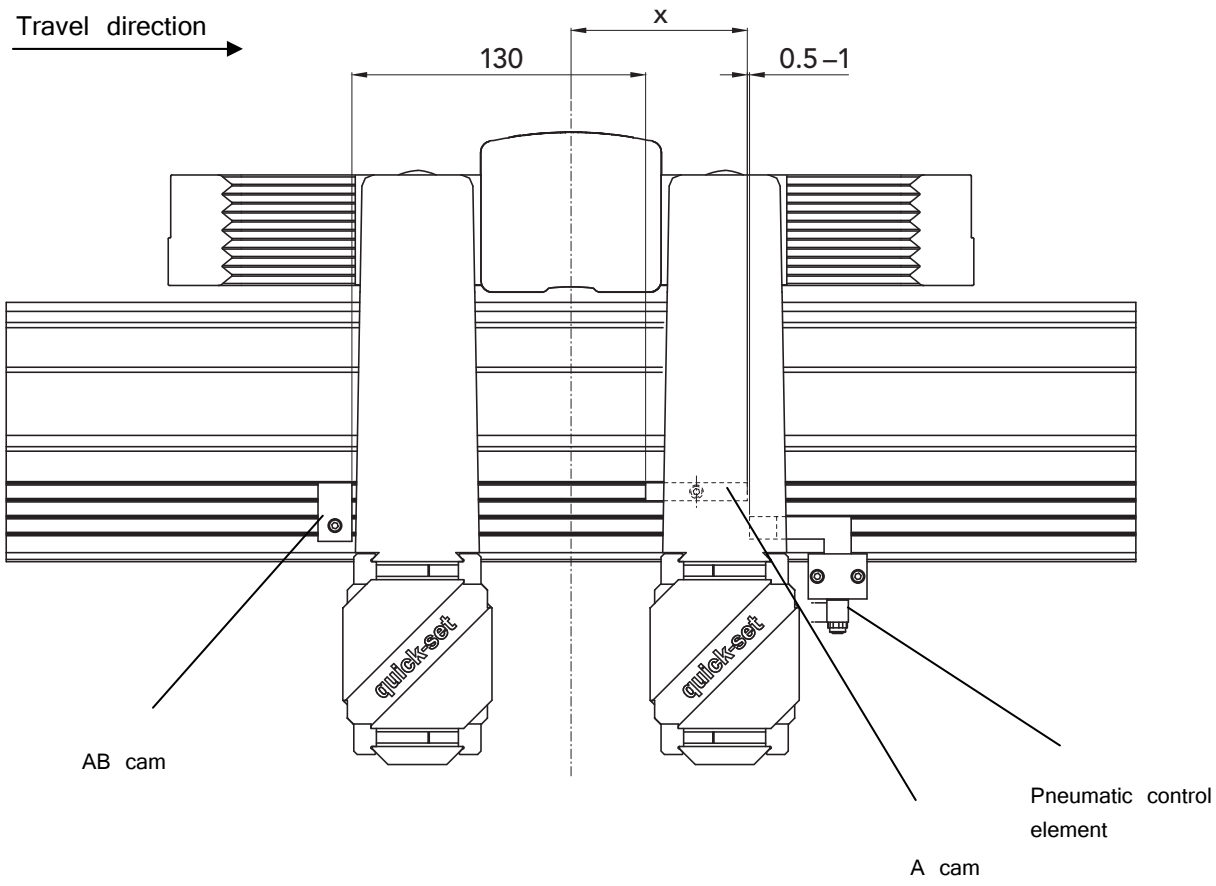
With electronic control element:

Fig. 3.2-1: Arrangement of the control cams for SPV


Travel direction U
36.5
x
130
quick-set
quick-set
Electronic control element
A cam
AB cam


Travel direction GU
x
130
24
quick-set
quick-set
AB cam
Electronic control element
A cam

With pneumatic control element:



Platform length (mm)	**x** (mm)
300	78
400	128
550	203

Information:

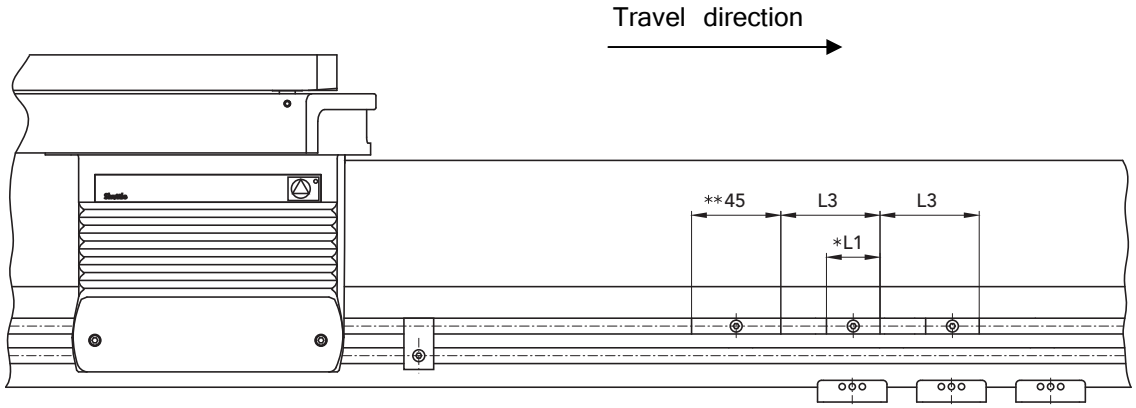
The dimension x is a theoretical dimension. The position of the control cam depends on the V-guide in the platform. In other words: the cam should be positioned so that, when the shuttle is stationary, the V-guide in the platform comes to rest at the height of the locking slide of the positioning unit. The procedure for exact positioning is described in Section 3.1.6.

3.3 Arrangement of the control cams in multiple positioning unit

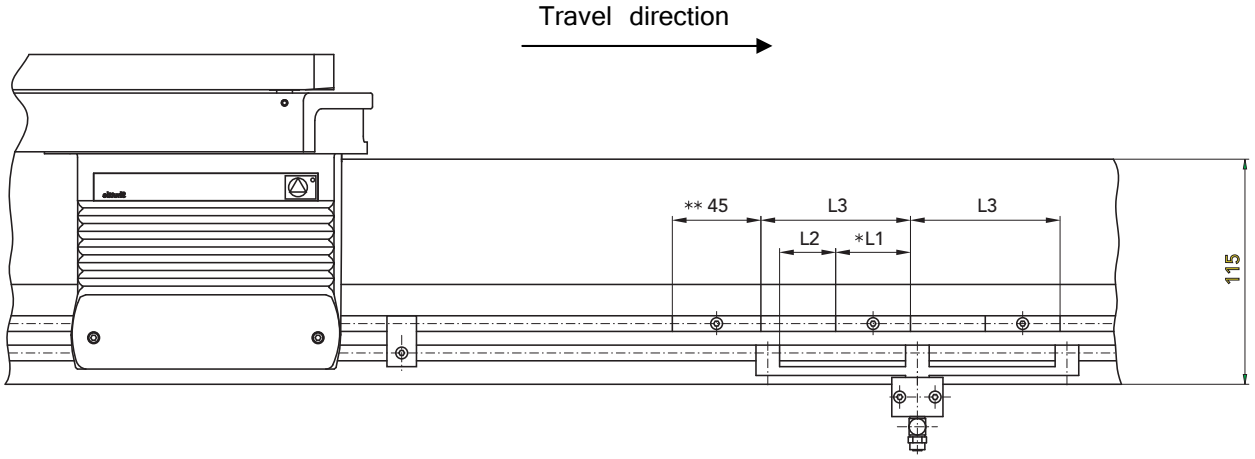
Fig. 3.3-1: Arrangement of the control cams for MPV (spacing L3 ≤ 90 mm)

Spacing L3 ≤ 90 mm

With electronic control element



With pneumatic control element



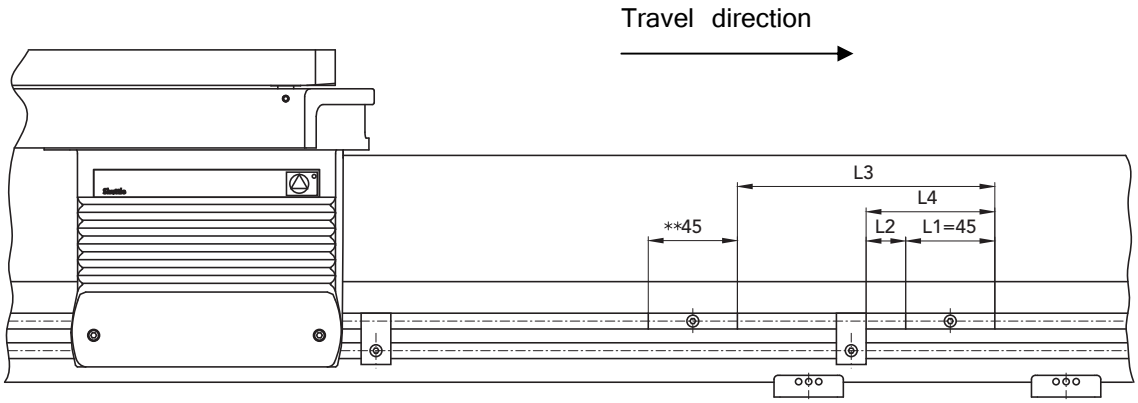
Spacing **L3**	**L1***	**L2**
40 mm < **L3** ≤ 90 mm	**L3**/2	**L1** − 12 mm (but min. 10)

* The calculated cam length L1 should be rounded up to whole mm.

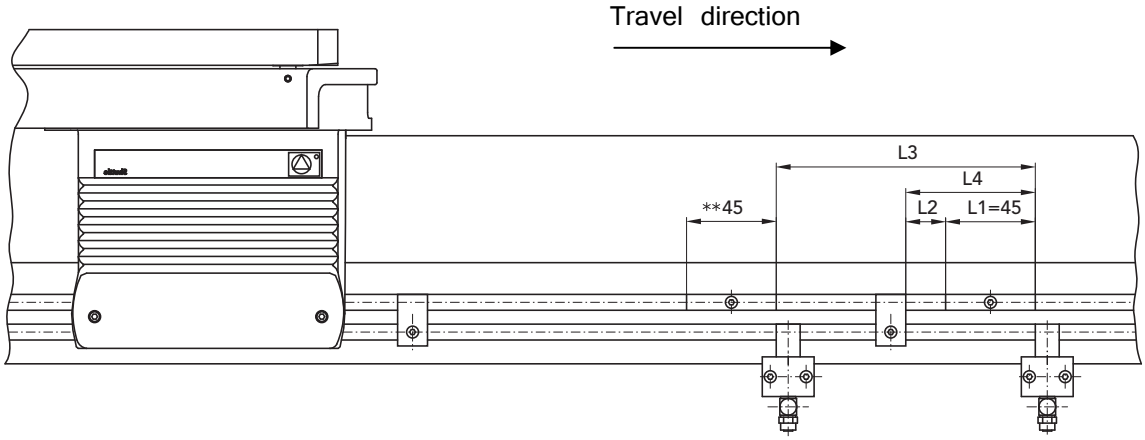
Fig. 3.3-2: Arrangement of the control cams for MPV (spacing L3 > 90 mm)

Spacing L3 > 90 mm

With electronic control element



With pneumatic control element

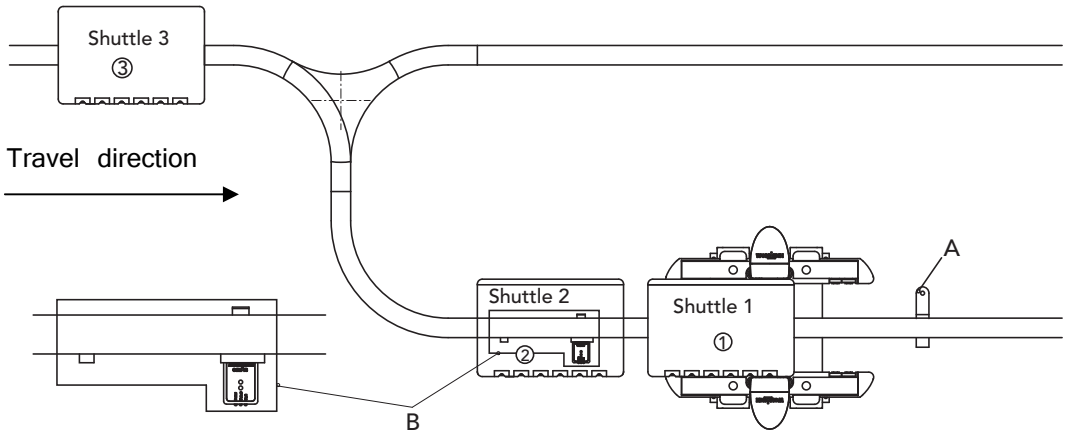


Spacing **L3**	**L2**	**L4**
90 mm < **L3** < 120 mm	10 mm	55 mm
120 mm ≤ **L3** ≤ 300 mm	**L4** − 45 mm	**L3**/2

** The position of the first control cam depends on the V-guide in the platform. In other words: the cam should be positioned so that, when the shuttle is stationary, the V-guide in the platform comes to rest at the height of the locking slide of the positioning unit. The procedure for exact positioning is described in Secton 3.1.6.

3.4 Additional monitoring and control elements for multiple positioning

Fig. 3.4-1: Additional monitoring and control elements for the MPV

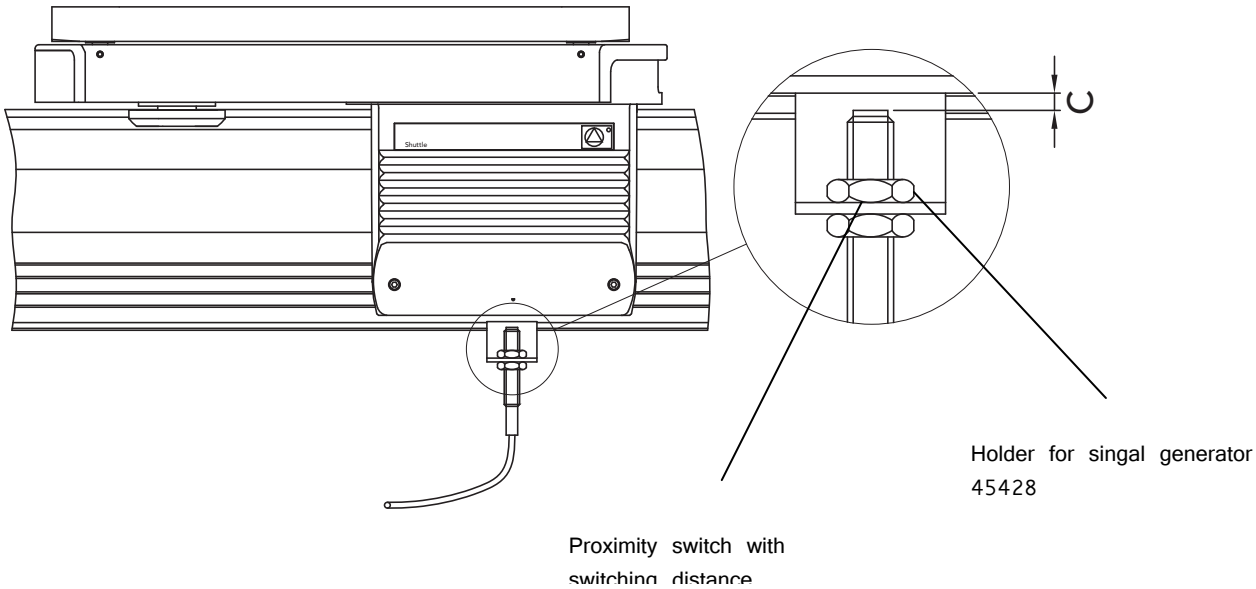


(A) Presence check for "Shuttle 1" at the last position in the multiple positioning unit
(B) Stop/Start element for "Shuttle 2" in waiting position

(1) Shuttle in working position
(2) Shuttle in waiting position before positioning unit
(3) Shuttle in waiting position before inlet gate

If (A) is damped by "Shuttle 1", "Shuttle 2" can be started.
Shuttle (3) can be started when "Shuttle 2" has reached the first position in the multiple positioning unit (according to position "Shuttle 1").

Fig. 3.4-2: Shuttle present at logoff with proximity switch



The distance "C" between the proximity switch (switching distance S_n = 4 mm) and the damping must be set at 1.5 – 2 mm.

3.5 Movement of the shuttle platform due to the indexing process

In the indexing process for the shuttle platform, the latter is pressed by the Pusher (20, Fig. 5.3) against the deep-groove ball bearings (270, Fig. 5.2), which are arranged in the beam (30, Fig. 5.2). In the course of this, the beam (30, Fig. 5.2) moves with the shuttle platform as follows:

Drive pressure P (bar)	**Movement of the beam** (40, Fig. 5.2) □f (mm)
2	0.008
3	0.016
4	0.025
5	0.034
6	0.042

Adjustment work at a specific point of the shuttle platform must always be carried out in the indexed state and under operating pressure!

4 Maintenance

Every 6 months

4.1 Check the PV with the setting gage

Check the PV with the setting gage according to Chapter 3 Commissioning.
PV width 200 mm Art. No. 55386, PV width 300 mm Art. No. 55387

4.2 Clean and oil locking slide

The locking slide should be cleaned and should be lubricated with Paraliq P460 Art. No. 504719.

4.3 Clean PV

The PV/MPV should be cleaned to remove dirt.

4.4 Check buffer

The rubber buffers at the end should be checked. Damaged or missing buffers should be replaced. Buffer left Art. No. 91453, buffer right 91454.

4.5 Wtih pneumatic control elements, check starting vane in the MPV

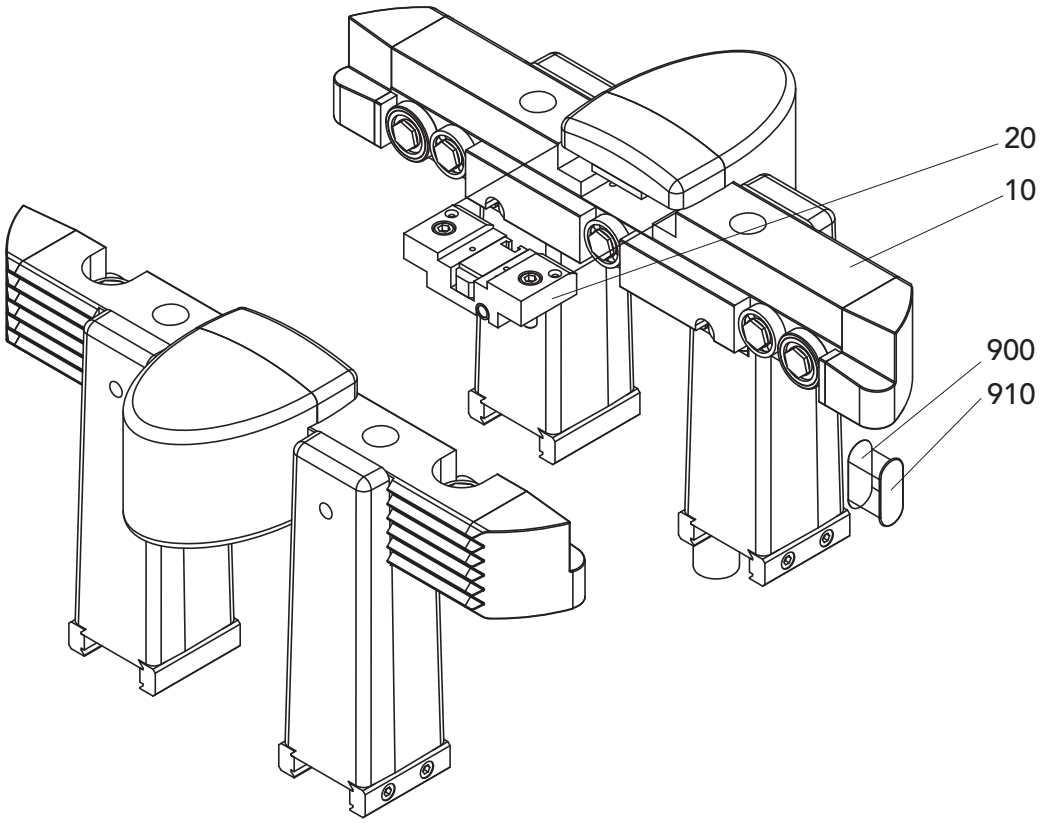
Check starting vane (Fig. 3.2) in the MPV for secure fixing and for damage. Fix or replace.

5 Spare parts for PV-2/3

Single positioning unit	**200 x 300:**	Art. No. 55290
	300 x 400:	Art. No. 55292
	200 x 550:	Art. No. 55294
Multiple positioning unit	**200 x 300:**	Art. No. 55291
	300 x 400:	Art. No. 55293
	200 x 550:	Art. No. 55295

5.1 Spare parts for PV-2/3

Fig. 5.1-1: Exploded drawing of positioning unit PV-2/3

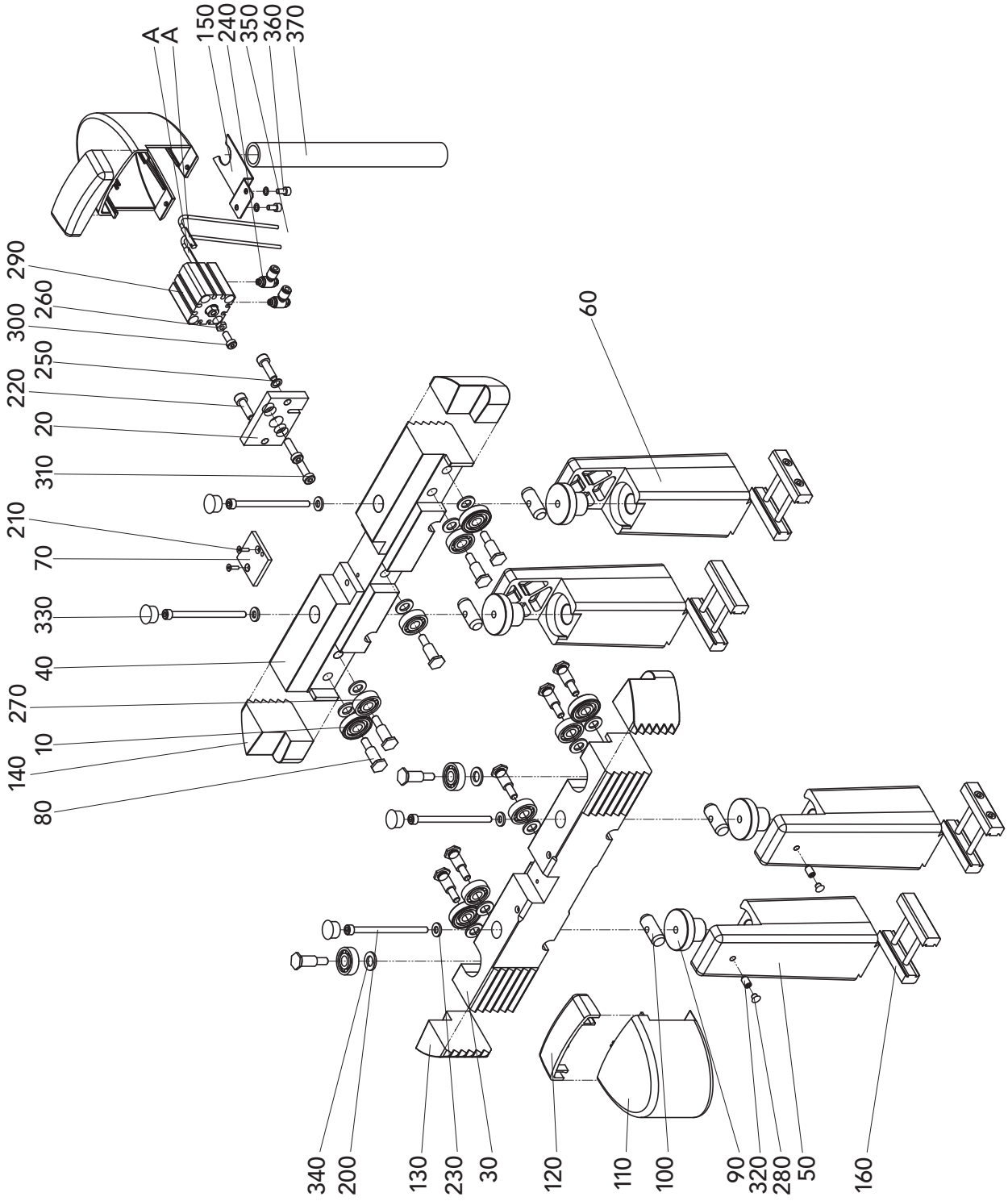


5.1.1 Spare parts for PV-2/3

Item	Designation	Article number					
	PV-2/3	SPV 200x300	SPV 300x400	SPV 200x550	MPV 200x300	MPV 300x400	MPV 200x550
10	Base structure for PV-2/3	55317	55319	55321	55318	55320	55322
20	Conversion set for PV-2	55315	55315	55315	55315	55315	55315
900	Identification plate CE	41620	41620	41620	41620	41620	41620
910	Identification plate plaque	48508	48508	48508	48508	48508	48508
The marked articles are wearing parts and are available from stock.							

5.2 Spare parts for base structure for PV-2/3

Fig. 5.2-1: Exploded drawing of base structure for positioning unit PV-2/3



A: Signal generator D-F9P (Art. No. 506879)

not included in scope of delivery

5.2.1 Spare parts for base structure for PV-2/3

Item	Designation	Article No.						Material
	Base structure PV-2/3	SPV 200x300	SPV 300x400	SPV 200x550	MPV 200x300	MPV 300x400	MPV 200x550	
10	Roller	91315	91315	91315	91315	91315	91315	Various
20	Flange plate	55258	55258	55258	55258	55258	55258	Aluminum
30	Beam 1	91440	91463	91467	91455	91465	91469	Aluminum
40	Beam 2	55262	55286	55288	55285	55287	55289	Aluminum
50	Support 1	91443	91443	91443	91443	91443	91443	Aluminum
60	Support 2	91444	91444	91444	91444	91444	91444	Aluminum
70	Cover	91447	91447	91447	91447	91447	91447	Aluminum
80	Axle	91448	91448	91448	91448	91448	91448	Steel
90	Knurled screw	91449	91449	91449	91449	91449	91449	Steel
100	Pin	91450	91450	91450	91450	91450	91450	Steel
110	Cover 1	91451	91451	91451	91451	91451	91451	ABS
120	Cover 2	91452	91542	91542	91542	91542	91542	ABS
130	Buffer left	91453	91453	91453	91453	91453	91453	Diepogral
140	Buffer right	91454	91454	91454	91454	91454	91454	Diepogral
150	Hose holder	55393	55393	55393	55393	55393	55393	Steel
160	SLL-55-40	40201N	40201N	40201N	40201N	40201N	40201N	Various
200	Machine screw M5x80	506194	506194	506194	506194	506194	506194	Steel
210	Countersunk screw M3x10	506735	506735	506735	506735	506735	506735	Steel
220	Machine screw M6x20	502519	502519	502519	502519	502519	502519	Steel
230	Washer 6x12x1.6	502576	502576	502576	502576	502576	502576	Steel
240	Exhaust air throttle M5/ø4	505023	505023	505023	505023	505023	505023	Various
250	Ribbed washer 6.4x10	505255	505255	505255	505255	505255	505255	Steel
260	Hexagon nut M5x0.5	505266	505266	505266	505266	505266	505266	Steel
270	Deep-groove ball bearing 609.2ZR	507354	507354	507354	507354	507354	507354	Various
280	Stopper 5x8x5	507304	507304	507304	507304	507304	507304	PA
290	Cylinder CDQSB20-10DC	506869	506869	506869	506869	506869	506869	Various
300	Machine screw M5x12	506873	506873	506873	506873	506873	506873	Steel
310	Machine screw M6x20	506874	506874	506874	506874	506874	506874	Steel

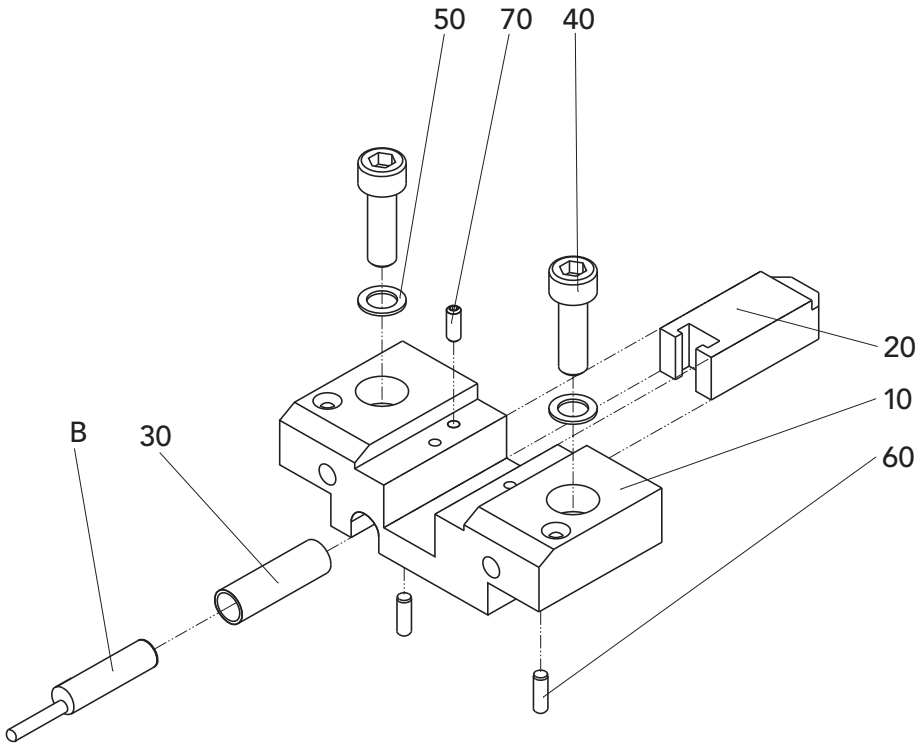
The marked articles are wearing parts and are available from stock.

Item	Designation	Article No.						Material
	Base structure PV-2/3	**SPV 200x300**	**SPV 300x400**	**SPV 200x550**	**MPV 200x300**	**MPV 300x400**	**MPV 200x550**	
320	Grub screw M6x10	508647	508647	508647	508647	508647	508647	Steel
330	Cap ø14.3x16.7x10	506878	506878	506878	506878	506878	506878	PA
340	Washer M8x16x1.6	506887	506887	506887	506887	506887	506887	Steel
350	Ribbed washer M4x7x0.5	502606	502606	502606	502606	502606	502606	Steel
360	Machine screw M4x8	502505	502505	502505	502505	502505	502505	Steel
370	Protective tube	508646	508646	508646	508646	508646	508646	PE

The marked articles are wearing parts and are available from stock.

5.3 Spare parts for conversion set for PV-2/3

Fig. 5.3-1: Exploded drawing of conversion set for positioning unit PV-2/3



B: Proximity switch ø6.5 (Art. No. 506321)

not included in scope of delivery

5.3.1 Spare parts for conversion set for PV-2

Item	Designation	Article No.						Material
	Conversion set PV-2	**SPV 200x300**	**SPV 300x400**	**SPV 200x550**	**MPV 200x300**	**MPV 300x400**	**MPV 200x550**	
10	Adapter for V-guide	92091	92091	92091	92091	92091	92091	Aluminum
20	Lock for V-guide	92093	92093	92093	92093	92093	92093	Steel
30	Clamping sleeve ø8	42009	42009	42009	42009	42009	42009	POM
40	Machine screw M6x20	502519	502519	502519	502519	502519	502519	Steel
50	Ribbed washer 6.4x10x1.2	505255	505255	505255	505255	505255	505255	Steel
60	Straight pin ø3x10	502020	502020	502020	502020	502020	502020	Steel
70	Grub screw M3x8	503796	503796	503796	503796	503796	503796	Steel
The marked articles are wearing parts and are available from stock.								

6 Environmental compatibility and disposal

6.1 Surface treatment

- Anodic oxidation of aluminum
- Nickel-plating of brass
- Galvanizing of steel
- Coating of plastic

6.2 Shaping processes

- Profile extruding of aluminum
- Die-casting of aluminum
- Injection molding of ABS
- Foaming of Diepogral

Machining of aluminum, steel, POM

6.3 Emissions during operation

- See EMC emissions

6.4 Disposal

Positioning units that are no longer in use are to be dismantled and recycled according to the type of material. The type of material for each part is stated in the spare parts lists. Any non-recyclable material is to be disposed of properly according to materials, taking into account the regulations which apply in your location.

7 List of figures